PPALoG

Data Logging Software

Software User Manual

N4L
PPA
LoG

V3_0e

ABOUT THIS MANUAL

PPAIoG is a self contained executable software program for use with the N4L PPA500, PPA1500, PPA2500, PPA2600 and PPA5500 power analyzers.

Accordingly, this manual first describes the general features and specification of the software as a whole; and then describes the individual functions in detail.

Each function is described in turn, in its own chapter, with details of the principles on which it is based, how to use it, the options available, display options etc.

Revision:

30th July 2013

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Appendix A   Configurable parameters

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1 Introduction – general principles of operation

1.1   Introduction

PPALoG is a self contained executable software program written in C++ using the Microsoft win32 graphics set.

PPALoG has the ability to connect to the PPA series of instruments via RS232, USB and LAN. The software includes all measurement modes to reflect instrument operation.

The ability to export directly to excel is supported by PPALoG

Firmware V2_106 was used to compile this User Manual

2 Getting started

2.1   Download

As with all N4L software, it is available free to download from our website. See www.newtons4th.com/support for more details, once registered and your account is activated you will have access to the software downloads section.

2.2   Installation

At N4L we try to develop software that enables the engineer to be up and running and performing tests as soon as possible. With this in mind we have avoided the use of the .net environment and used the Microsoft win32 graphics set.

As such, installation is simple. All that is required is to download the .exe from the N4L website and extract the software to the desired location on your hard drive.
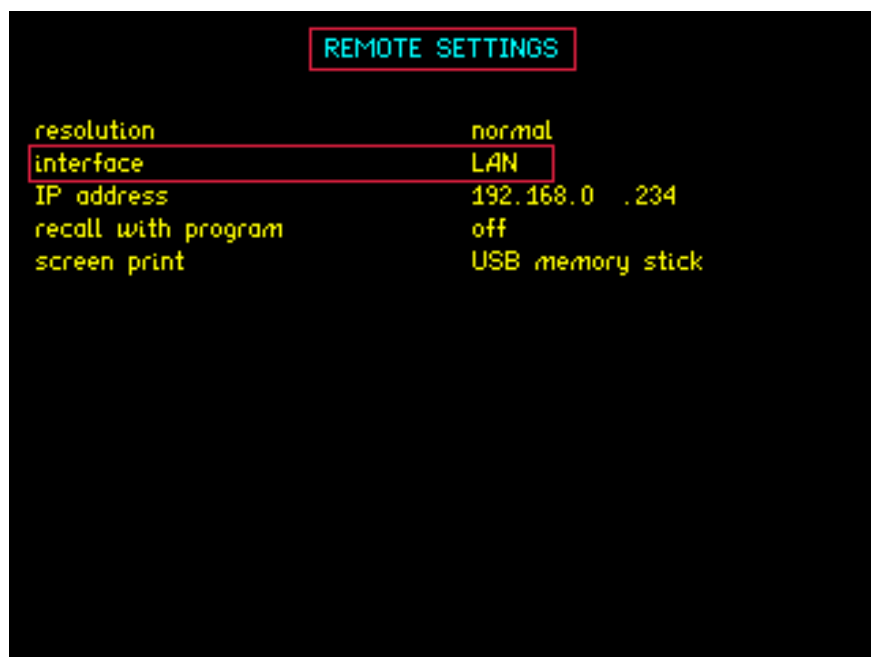
Alternatively the software can be run directly from USB memory stick.

2.3   Connection

Once the unit has powered on, it is now time to connect the instrument to the PC, this can be via USB, RS232 or LAN.

Ensure the Instrument is correctly set up to reflect the connection interface you are using.

The communication parameters are set in the REMOTE menu on the instrument.

Using the down arrow, select Interface option, then by pressing the right arrow this will enable you to select your desired interface option to communicate between the instrument and PC.

Once the software is opened, to connect to your N4L PPALoG Software to the power analyser, select Configure -> Connection
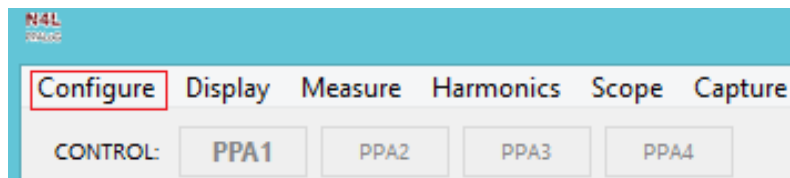
Enter the number of phases/instruments to be connected and connect each PPA with its corresponding interface connection.
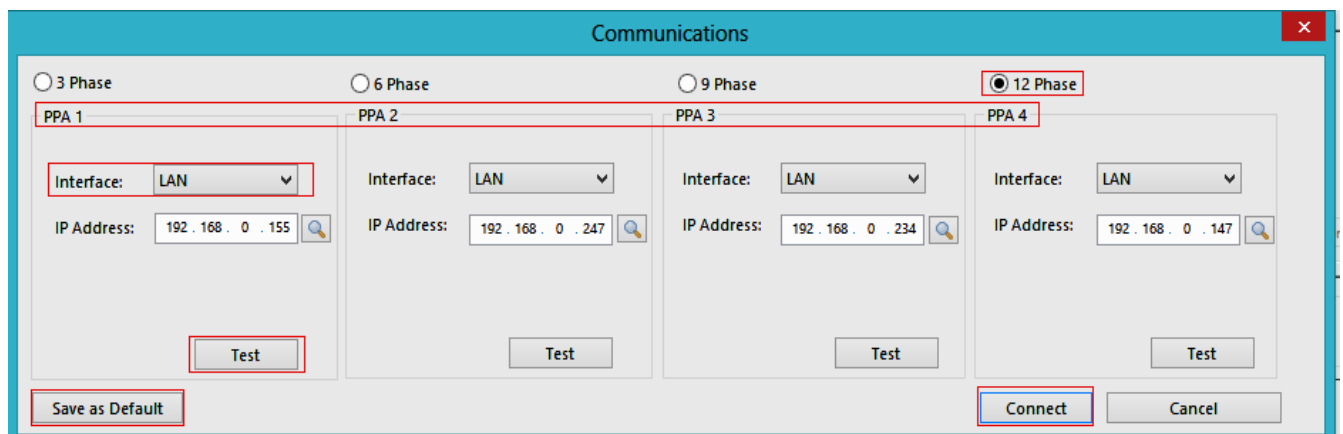
Once all connections are set, click on the Connect option to start communicating between your PC and Instrument.

Note: *Pressing "Test" will check if your connection settings are correct, "Save as Default" will remember these settings whenever you load PPAlog*

2.4   Configuration Pane

Once the software has connected to the PPA it is time to begin to interact with the instrument.

The area within the Green bounding box is known as the "Configuration Pane" When any changes are made to the

settings in this box the user MUST select "SET UP PPA" (Blue Box) in order to send the command string to the instrument.
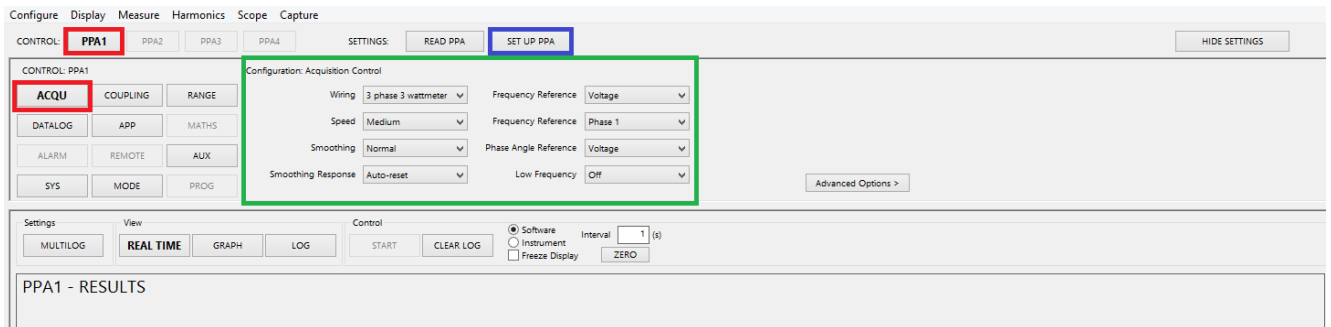
2.5   Initial PPA Setup using the Application mode setting

If this is the first time you are using a PPA for measurements, it may be helpful to use the "Application" configuration mode, this mode contains various "default setups" for different typical applications, such as PWM Motor drive and Transformer measurement applications.

Configurable PPA'S will be shown in **BOLD** type at the top of the screen

Click on 'APP'

Click on drop down arrow in Mode section (Blue Box)

Select application to be used as per your requirements
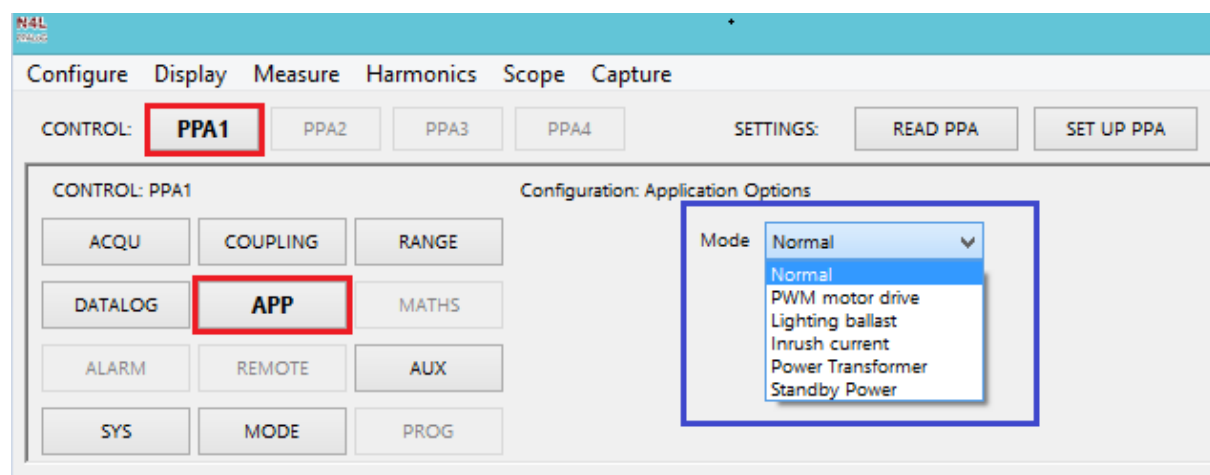
When the Mode to be used has been selected, configure all application settings from the drop down menus.
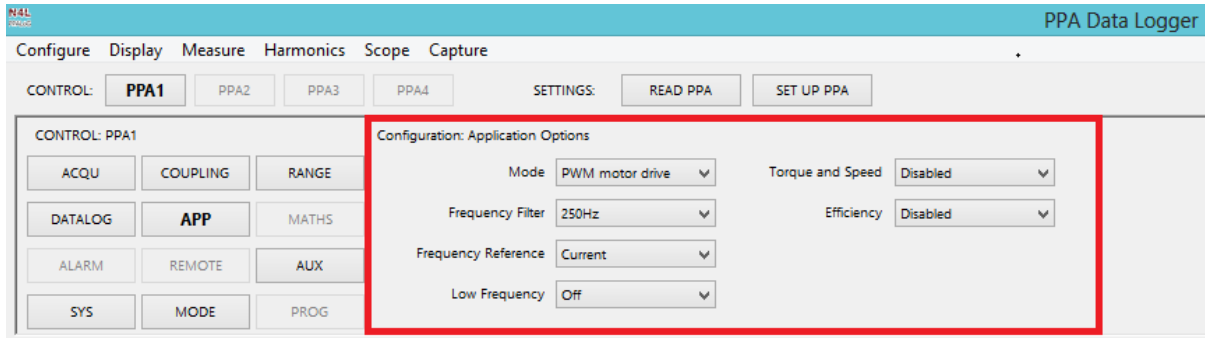
Using the application mode is not essential, manual configuration is possible through the configuration pane.

3 Parameter Selection

3.1 Multilog

To set the parameters you wish to acquire from each instrument we need to use the Multilog function
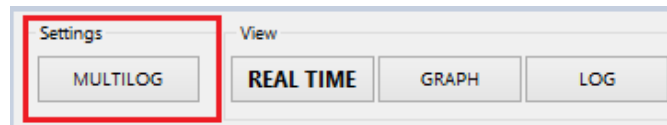
Click on the Multilog option to open up the Multi Log selection screen.

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1. Select the appropriate PPA to be configured (Top left red box)

2. Use the tick boxes to select appropriate parameters required for each phase on the selected PPA

3. Once selected this data can be stored and reloaded for future reference. Use the Store/Record Selection (Green Box)

4. When all parameters are set use the right hand side scroll bar to scroll down and click on OK.
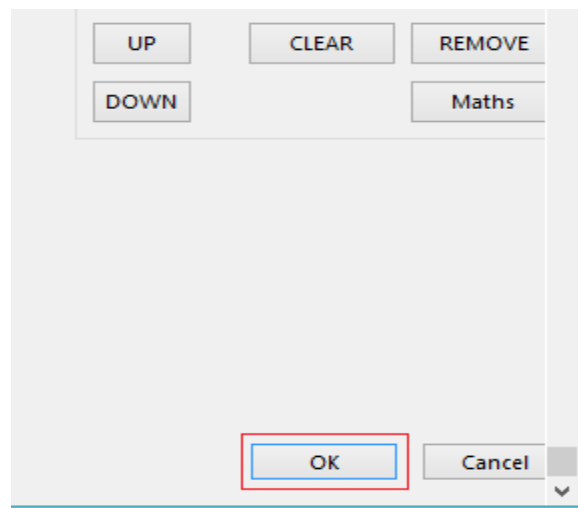
Note: When OK is clicked this will take you back to the Data Logger Screen for the actioned PPA.

To configure other PPA's re click on Multilog and follow all previous steps.

Use the Left and Right arrows next to PPAXX to select other configured PPA's

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When all PPA's are configured use the view all button to view all available PPA data

The data displayed will be in real time view

Select either the Software or Instrument mode (Green Box) to select the interval speed desired for testing.

3.2 Datalog Interval

Software – Datalog interval is selected in the Interval window in the software and the software will periodically send a MULTILOG? command to the instrument at the interval selected in the software.

Instrument – Speed selected within the ACQU speed window, this directly sets the window size on the PPA and the software update rate will depend upon new data being available from the PPA. In essence the software is in slave mode and the power analyzer is the master.

Note: In the Instrument mode the PPA display screen will freeze whilst log is running, but will unfreeze when log is stopped

Click on the Start window (Blue Box) to commence the test.
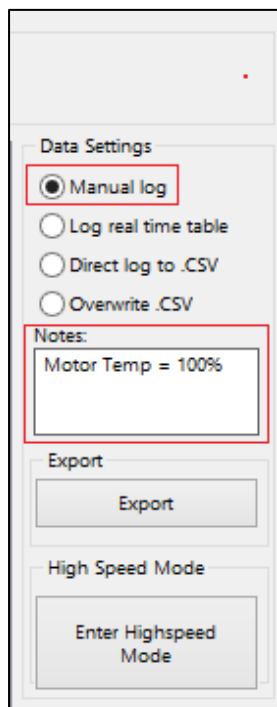
4   Data Setting Options

Once the instrument has been configured and the Multilog parameters set, we can start testing our device and recording data, these can be viewed in the 4 following formats.

4.1   Manual Setting:

In this mode the operator will be able to Start/Stop the display and gather the displayed data during a device's test cycle.

Notes can also be added to aid reading of results (shown below);

Select Manual log from the Data Settings Menu

A text string may be entered into the notes field; this can be used to highlight a mode change in the device under test in order to make sense of a trend in the recorded data.

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By clicking on the Real Time icon, we are presented with the "Real Time Display"

Real time windows will now start showing the results.

Click "Stop" to pause the test

Click "Log" (Yellow Box) this will bring up an initially empty log data sheet

At this point before we review our data you are able to add any notes relating to this section of the test.

Add text into "Notes" (Blue Box)

Click "Append" (Green Box). This will now record all results *at this appropriate point in the test* and display them on the first line with any notes you have inputted

You are now able to select the Start, Stop, Real Time and Append icons to record more data.

Remember to enter any new notes in the Notes box before selecting Append to view your results (Stop will display when Start is activated)
After a period of time you will build up a Data Log of all your results

Notes field relates to different parameters within your test cycle

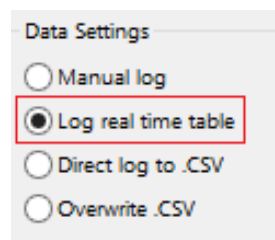|	Time	Frequency PH1 PPA1	Watts PH1 PPA1	VA PH1 PPA1	VAr PH1 PPA1	RMS Voltage PH1 PPA1	RMS Current PH1 PPA1	Notes
55	10:50:37.515	27.000 Hz	7.0630 W	22.384 VA	-21.240 VAr	122.84 V	182.22 mA	
55	10:50:37.515	27.000 Hz	7.0630 W	22.384 VA	-21.240 VAr	122.84 V	182.22 mA	Motor Temp = 15%
137	10:53:35.417	27.001 Hz	6.8099 W	22.086 VA	-21.010 VAr	122.19 V	180.75 mA	Motor Temp = 20%
247	10:57:07.196	26.992 Hz	6.6864 W	21.520 VA	-20.455 VAr	120.54 V	178.53 mA	Motor Temp = 25%
288	10:58:07.504	27.000 Hz	6.7530 W	21.696 VA	-20.618 VAr	121.04 V	179.24 mA	Motor Temp = 30%
338	10:59:10.420	27.014 Hz	7.1636 W	22.055 VA	-20.859 VAr	121.57 V	181.42 mA	Motor Temp = 35%
426	11:00:58.115	27.000 Hz	6.7819 W	21.835 VA	-20.755 VAr	121.55 V	179.64 mA	Motor Temp = 40%
464	11:02:09.841	27.000 Hz	6.7641 W	21.859 VA	-20.786 VAr	121.56 V	179.82 mA	Motor Temp = 50%
498	11:03:01.271	27.000 Hz	6.7507 W	21.520 VA	-20.433 VAr	120.58 V	178.47 mA	Motor Temp = 60%
513	11:03:35.810	27.015 Hz	6.7669 W	21.876 VA	-20.803 VAr	121.94 V	179.39 mA	Motor Temp = 70%
534	11:04:26.459	27.000 Hz	6.7379 W	21.590 VA	-20.512 VAr	120.77 V	178.78 mA	Motor Temp = 80%
548	11:04:56.152	27.000 Hz	6.7917 W	21.609 VA	-20.514 VAr	120.79 V	178.90 mA	Motor Temp = 90%
656	11:06:58.293	27.001 Hz	6.7291 W	21.856 VA	-20.794 VAr	121.68 V	179.62 mA	Motor Temp = 100%

4.2   Log, real time table:

In the Log, real time table mode the software will allow all data parameters selected in Multilog to be viewed as the device is under test conditions and recorded in a Datalog. Results can be viewed in 3 formats: Real Time, Graph and Log. All will be displayed and updated according to the time set within the Datalog Interval control section.
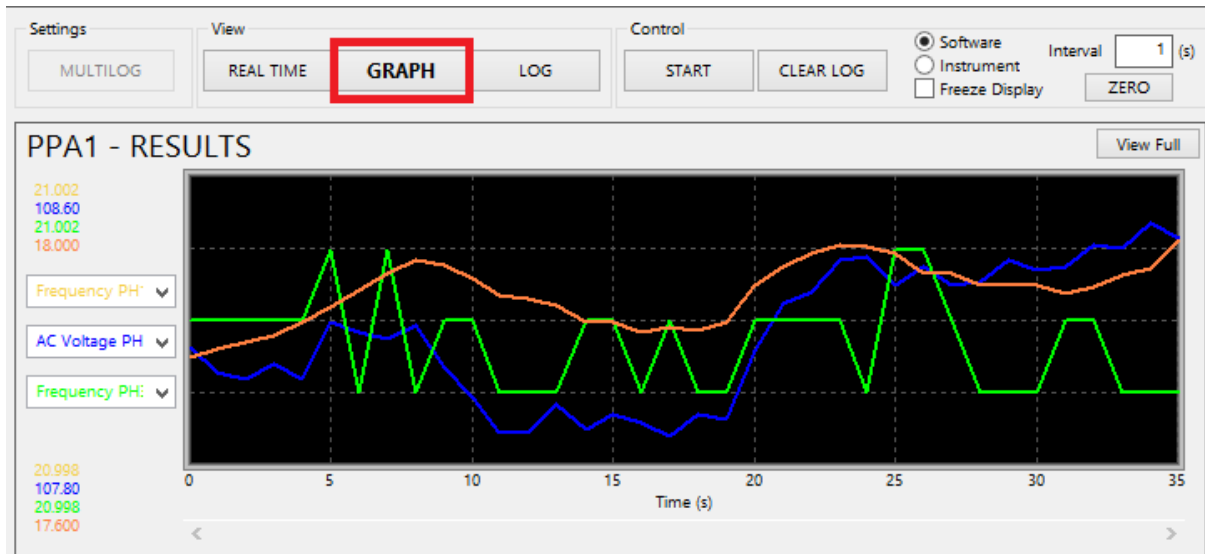

Real Time:

Graph:

Log:

4.3   Completing a Test, saving and clearing data

When the user has completed their analysis, the Stop Icon can be clicked and any Data up to this point can be viewed, the user will then have 2 options, to continue the test with the START button to enable more analysis to be collected, export existing data** or CLEAR LOG,

For exporting, please see section 4.6

If CLEAR LOG is selected, a prompt will now ask you to confirm if you would like to save your Multilog Results?
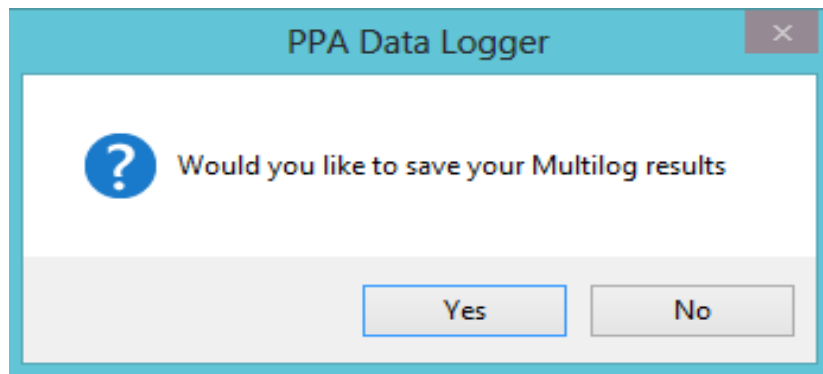

Clicking the Yes button will open up the "Select file for CSV logging window" to enable the data to be saved to a selected file in the users documents folder.

Clicking No will clear all data from the PPAloG screen

## 4.4   Direct log to .CSV (Comma Separated Values)

In the Direct log to .CSV option the software will collect and store all results in a CSV file, that will be stored and viewed within the users documents folder, once stored the file can be converted into an Excel spreadsheet file. This file can be used by external datalogging programs such as Labview to log data from the PPA without the burden of directly controlling the instrument.
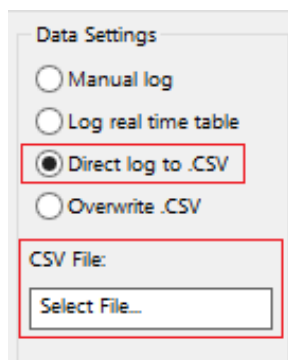
Select: Direct log to .CSV

Click in CSV file box: This will take you to the documents library
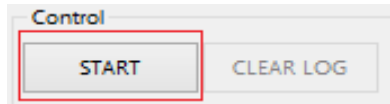
Name the folder where you wish your results to be saved, as described below:
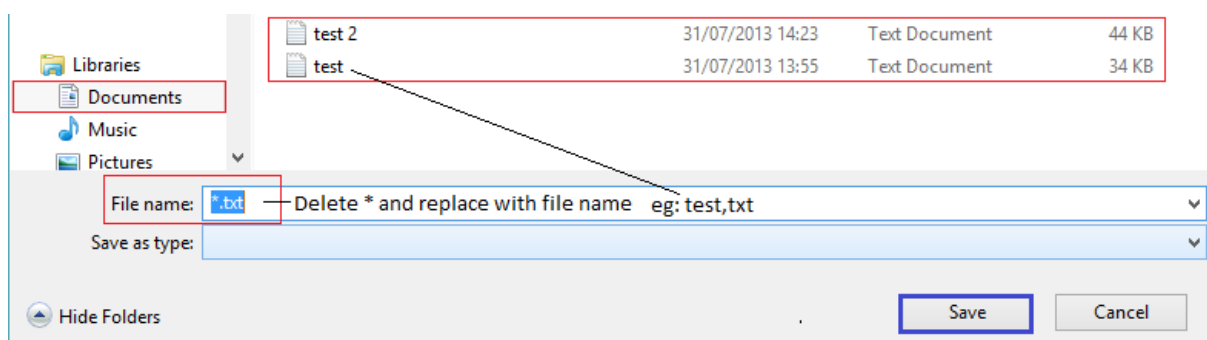
Click Save (Blue Box). The file will now be stored within your documents folder

To commence a test, Click START in the PPAIoG CONTROL section of the program window.
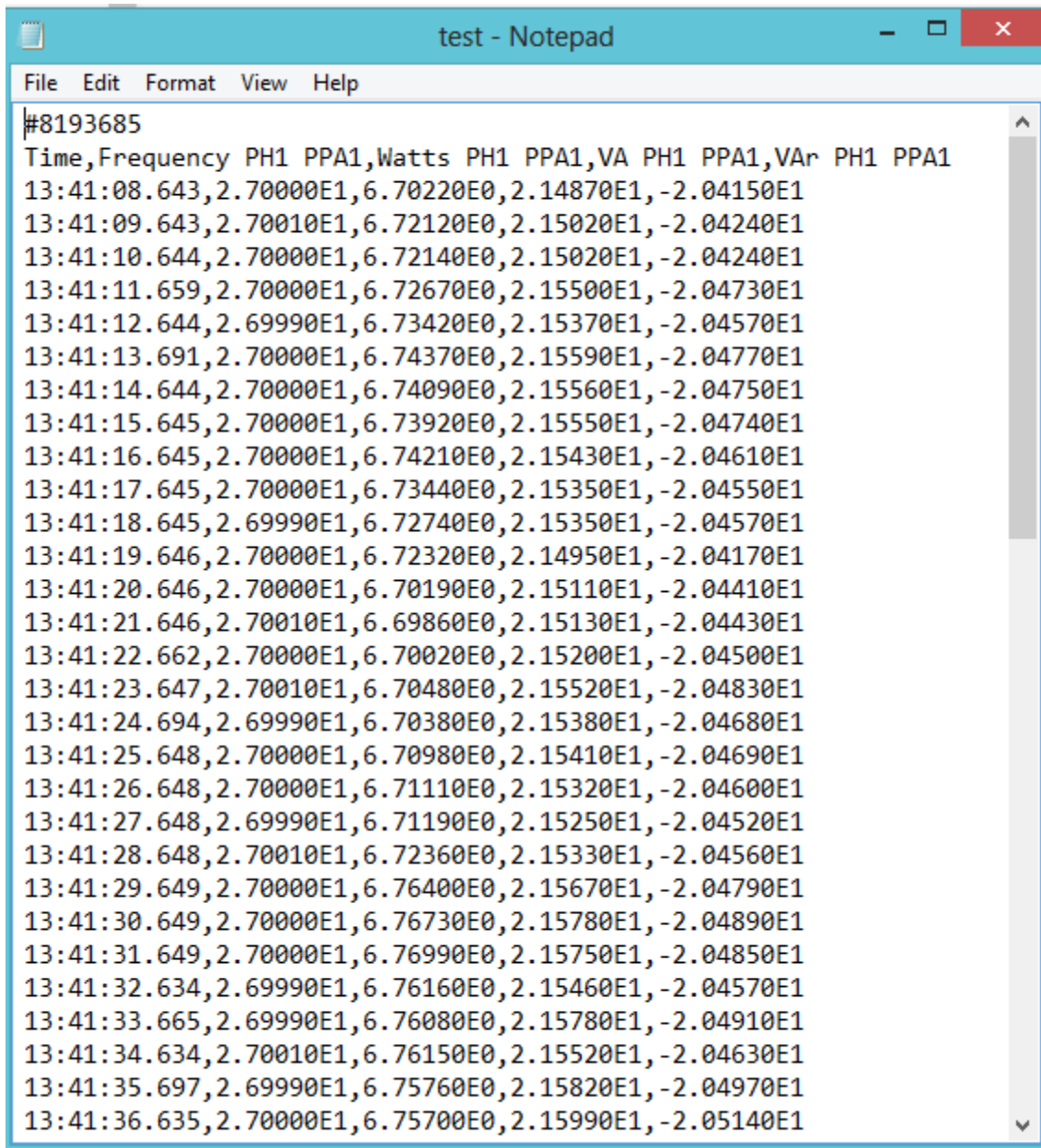

A test will begin and the real time display screen will be displayed

To view the recorded results, open up the documents file and locate the named test folder.

Open folder to display results in CSV format as shown, it can be observed that the log file will continue to append Datalog lines to the file.

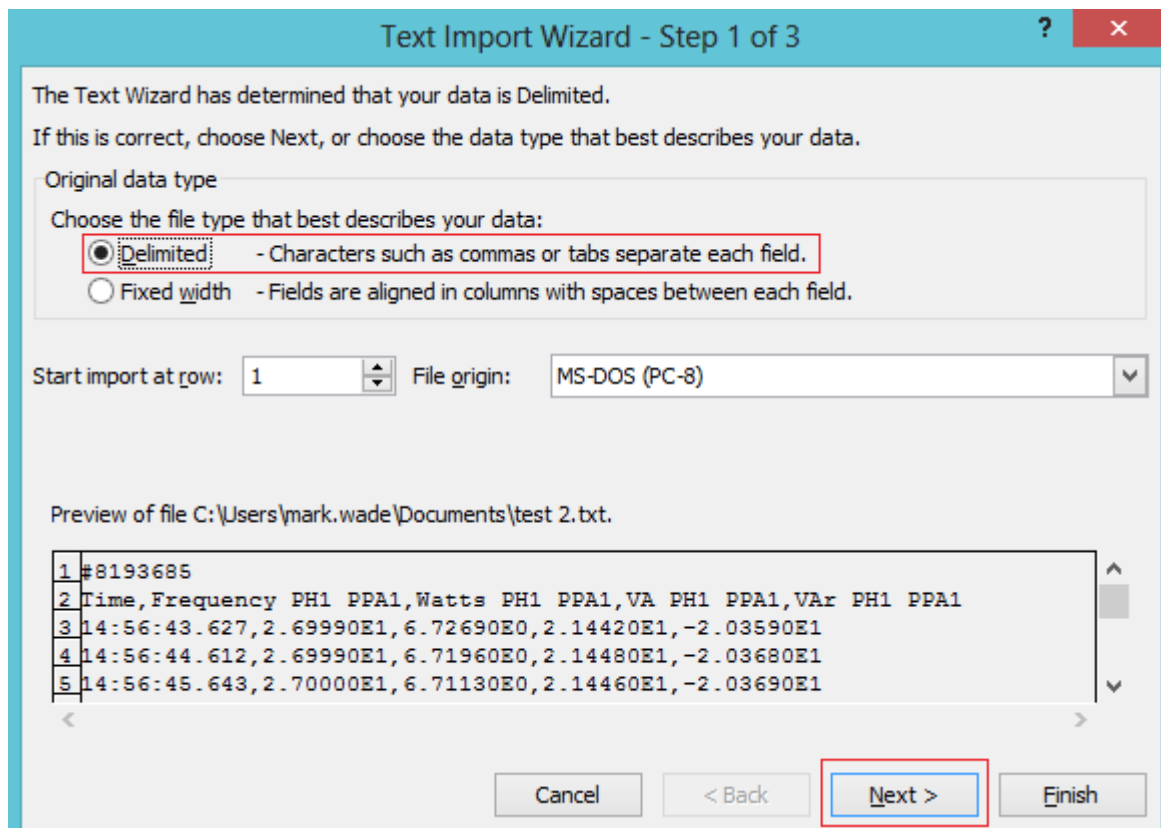To convert your CSV data file into an excel spreadsheet.

1. Open Microsoft Excel
2. Click on Windows icon in top left hand corner
3. Click on Open
4. Select File to convert
5. Change 'all excel files' to 'Text files'

6. Click Open
7. Text Import Wizard is displayed

8. Check that Delimited option is selected
9. Click Next

Tick and activate the 'Comma' Delimiter selection

Click Next

Click Finish

Results will now be displayed as an Excel Spreadsheet

	A	B	C	D	E
1	#8193685				
2	Time	Frequency PH1 PPA1	Watts PH1 PPA1	VA PH1 PPA1	VAr PH1 PPA1
3	56:43.6	2.70E+01	6.73E+00	2.14E+01	-2.04E+01
4	56:44.6	2.70E+01	6.72E+00	2.14E+01	-2.04E+01
5	56:45.6	2.70E+01	6.71E+00	2.14E+01	-2.04E+01
6	56:46.6	2.70E+01	6.72E+00	2.14E+01	-2.04E+01
7	56:47.6	2.70E+01	6.71E+00	2.14E+01	-2.04E+01
8	56:48.6	2.70E+01	6.69E+00	2.14E+01	-2.04E+01
9	56:49.6	2.70E+01	6.70E+00	2.14E+01	-2.03E+01
10	56:50.6	2.70E+01	6.70E+00	2.14E+01	-2.03E+01
11	56:51.6	2.70E+01	6.69E+00	2.14E+01	-2.04E+01
12	56:52.6	2.70E+01	6.68E+00	2.15E+01	-2.04E+01
13	56:53.6	2.70E+01	6.68E+00	2.14E+01	-2.04E+01
14	56:54.6	2.70E+01	6.69E+00	2.14E+01	-2.04E+01
15	56:55.6	2.70E+01	6.68E+00	2.15E+01	-2.04E+01
16	56:56.6	2.70E+01	6.67E+00	2.15E+01	-2.04E+01
17	56:57.6	2.70E+01	6.68E+00	2.14E+01	-2.04E+01
18	56:58.6	2.70E+01	6.67E+00	2.14E+01	-2.04E+01
19	56:59.6	2.70E+01	6.67E+00	2.15E+01	-2.04E+01
20	57:00.6	2.70E+01	6.67E+00	2.14E+01	-2.04E+01

4.5   Overwrite .CSV

This method of data acquisition creates a .csv file at a location of the user's choice and will overwrite a single Multilog Datalog line of results at an INTERVAL set by the user in the CONTROL section of PPALoG.

Follow instructions as for Direct log to .CSV to store, view and convert.

4.6   Export

Within the Data settings options the software allows the user to select how they wish to save and view all data collected. By clicking on the Export button in any of the 4 data settings a window will open for the user to select which option they would like to choose.

Export to Excel will take the data and instantly open up an Excel file with all results populated. This will allow the user to save files for later analysis.

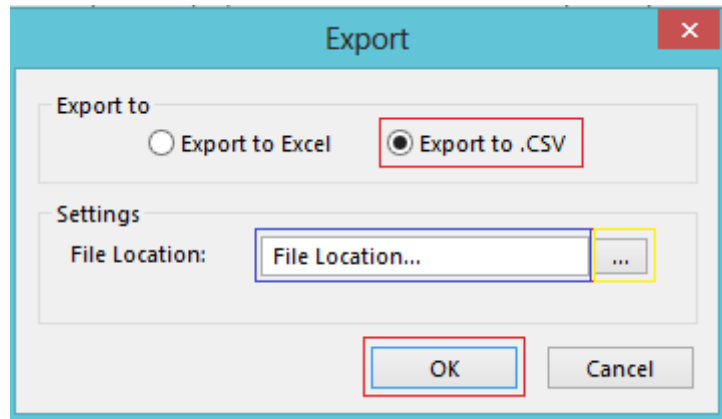The data can be exported and viewed in 3 different formats

Standard – Data extracted as it is actually displayed
 ie: 0.1234V

Engineering – Data extracted and displayed in an Engineering format ie: 123.4mV

Scientific – Data extracted and displayed in a Scientific format ie: 1.234 E-1
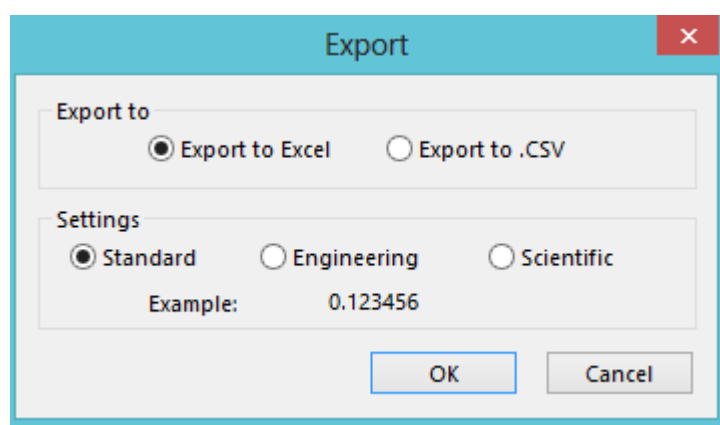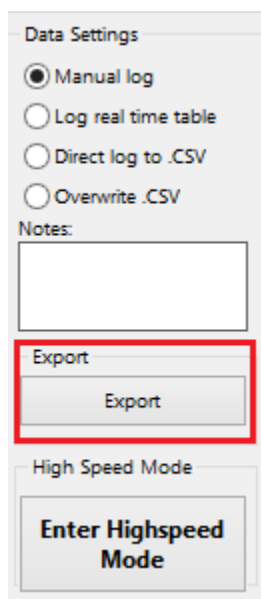
4.7   Export to .CSV option

In the .CSV option all data collected can be converted and saved into a CSV (Comma Separated Value) file within the documents folder on the computer's hard drive

1. Click on the Export icon
2. Select Export to .CSV option
3. Click on (Yellow Box) this will take you to your documents files
4. Select a folder to save the converted data to
5. This will now show in the File Location (Blue Box)
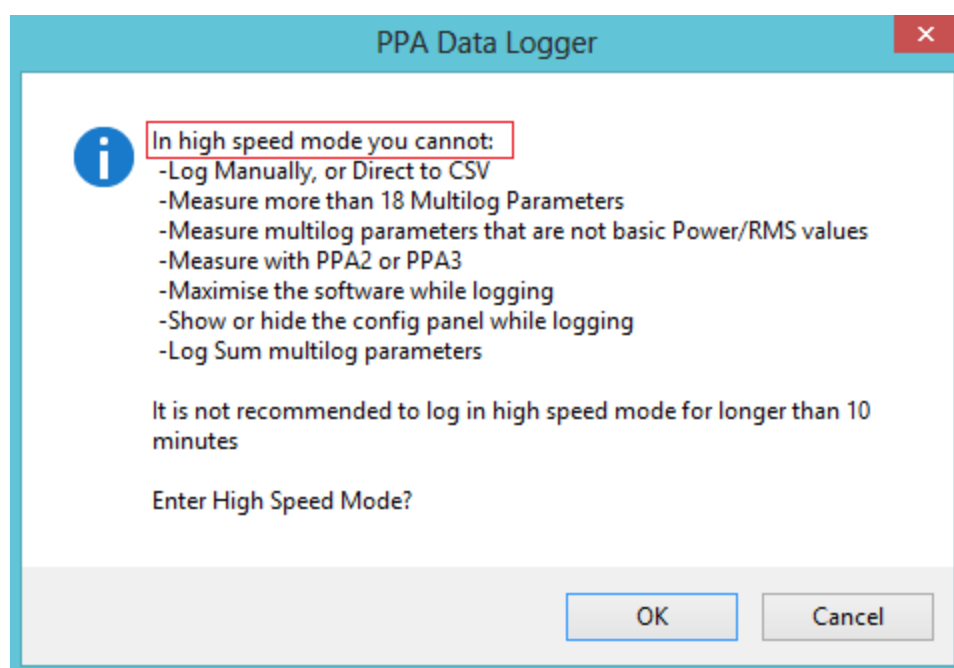6. Click on OK to transfer data results
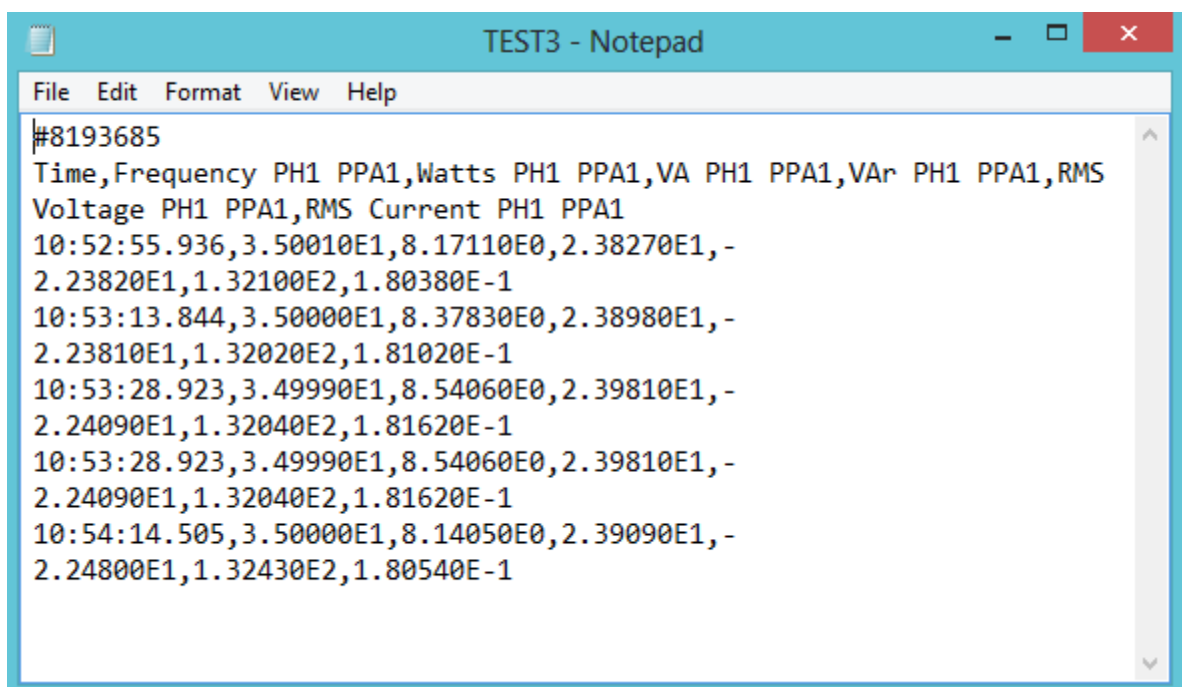
5   High Speed Mode

5.1   User Guide

High speed mode will be prompted when the window interval speed selected is less than 100mS
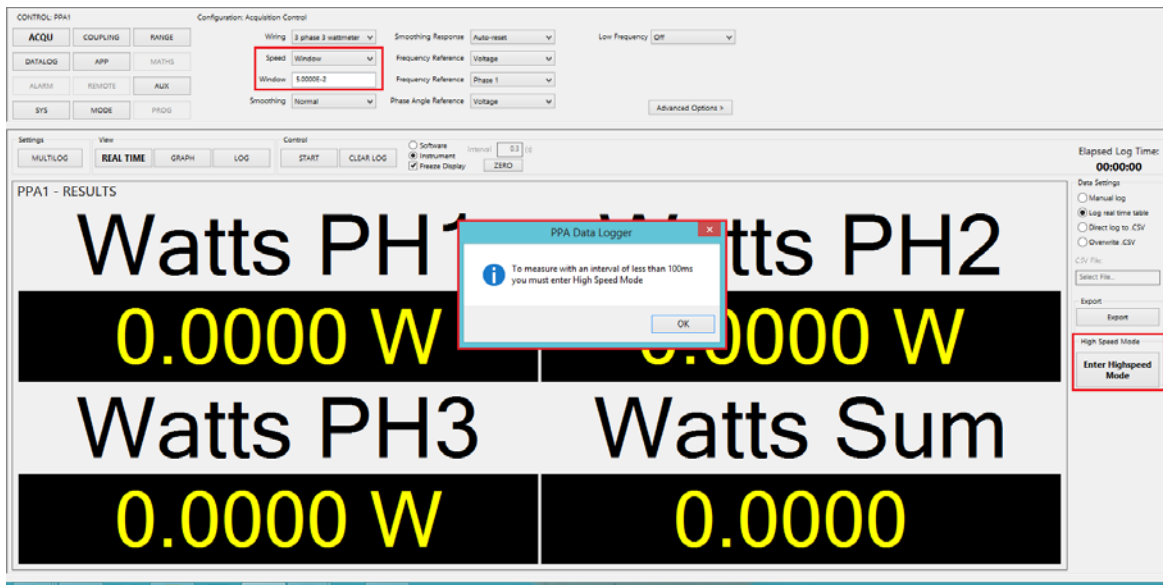
When entering High Speed Mode there are certain configurations that will submit a prompt asking whether or not you wish to continue?

Should you require the sum data of specified parameters whilst measuring in High Speed Mode you can set this up manually in MATHS mode (Section 6) and select the user created parameter in the Multilog Parameter selection window.

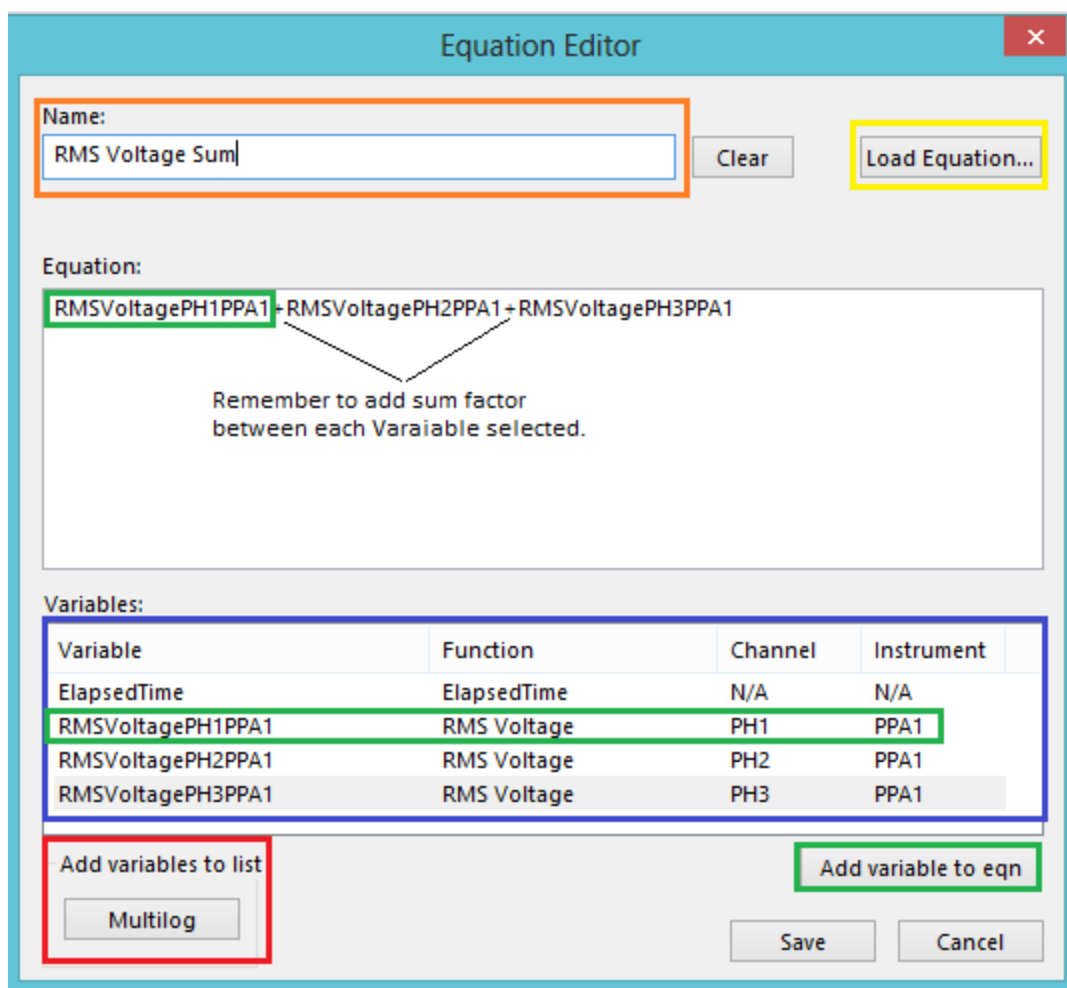## 6 Maths mode and Equation Editor

6.1 User Guide

PPALoG supports the function of user created equations using data selected in the Multilog selection pane.

Click on Configure at the top of the PPALoG
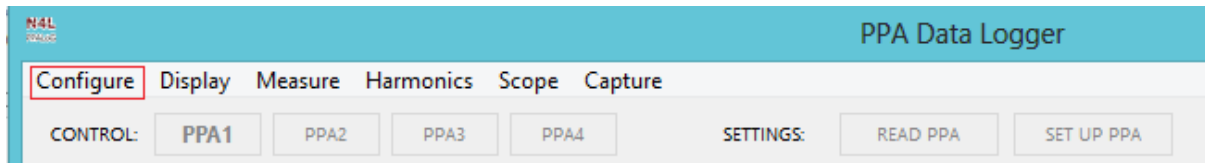
Click on Add / Edit Equations
This will open up the Equation Editor Box

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Click on Multilog Icon and select Parameters to be added (Parameters must be selected in the Multilog Menu to be used in the Equation editor)

Click on OK and these Parameters will be populated into the Variables box. (Blue Box)

Click on and select the first Parameter required in your equation, then click on Add variable to equation, this will then submit your chosen parameter into the Equation (Green Box's)

Once your first variable has been added you now need to enter a sum factor into the equation

Repeat until all variables are submitted into the equation.

Name your equation to be saved (Orange Box)

Click on the Save icon

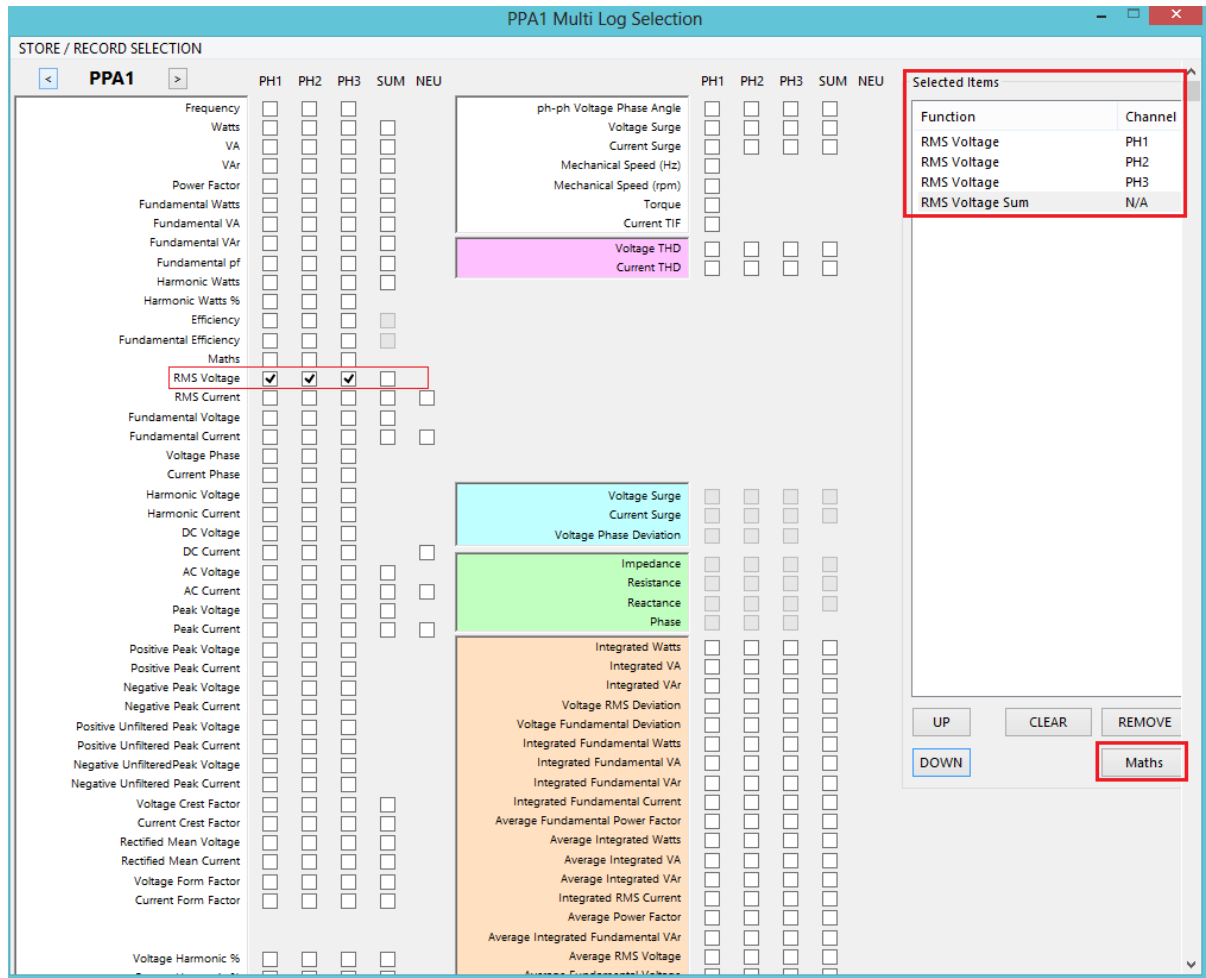Click on Load Equation (Yellow Box)

Load Equation Box will now appear.
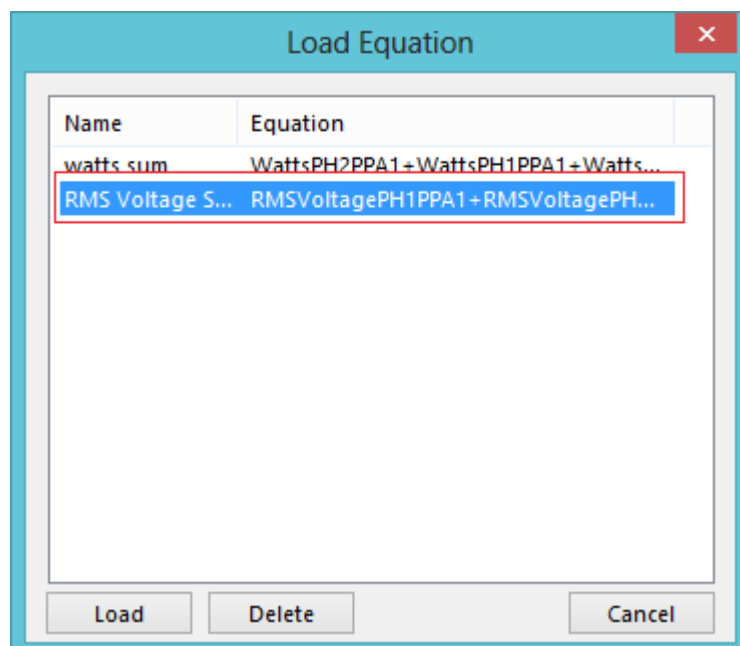
Highlight your saved equation and click Load

Close Equation Editor

Open up Multilog menu from the PPAIoG

To select a user created equation and record the parameter in the Datalog, perform the following actions;

Click on the Maths Icon

Load equation Window re-opens

Select saved equation

Click on Load

Ensure individual parameters used the equation are also selected
Click OK; this will take you back to PPAIoG

7   Efficiency Measurements

7.1   User Guide

Efficiency measurements can be calculated and viewed within PPALoG software

The following data was compiled measuring a 3 phase inverter motor drive application with the fundamental frequency set at 65Hz

Multilog Parameter settings.

Select the measurement parameters required. Efficiency parameters have been marked out within the red box; these are then shown within the selected items column on the right hand side of the display, scroll down and confirm selections by pressing OK

Pressing OK will return the display back to the measurement screen where all selected parameters will be displayed within the order that they were selected as shown below
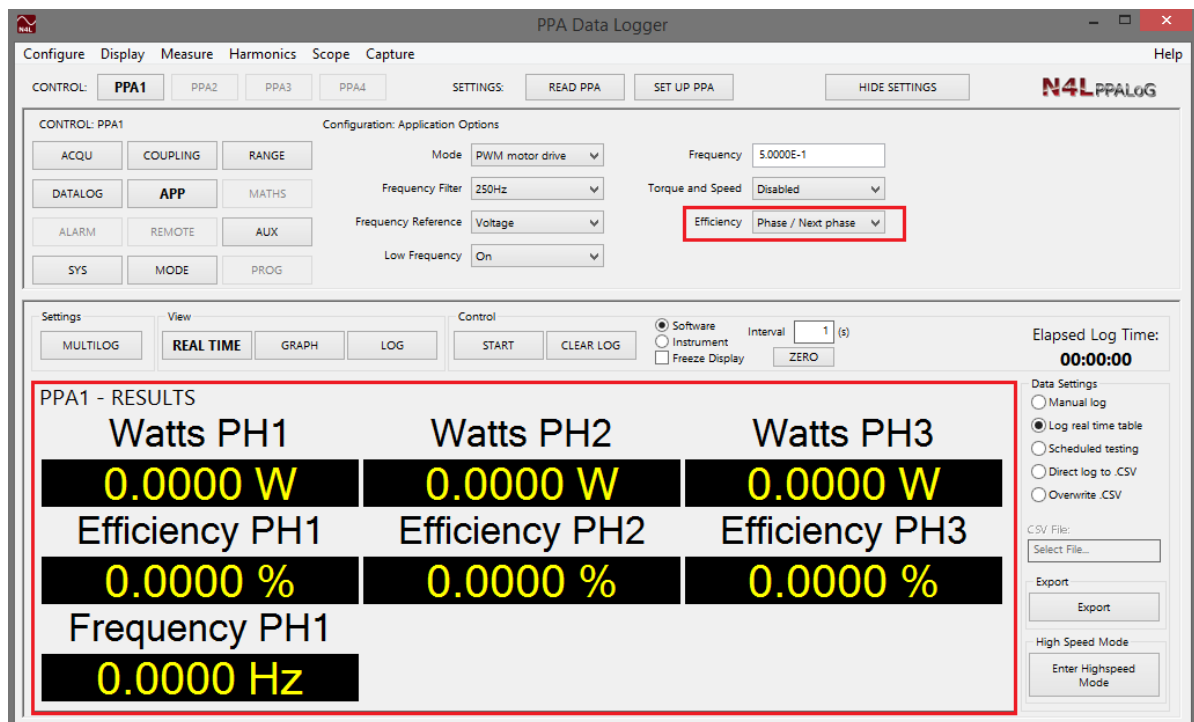
Within this same display you will be required to select from the drop down menu how you wish the efficiency measurement to be calculated, for this manual, selection was: Phase / Next Phase. Once the selection has been made remember to send this information to the PPA instrument

Press the "START" icon to run the software program
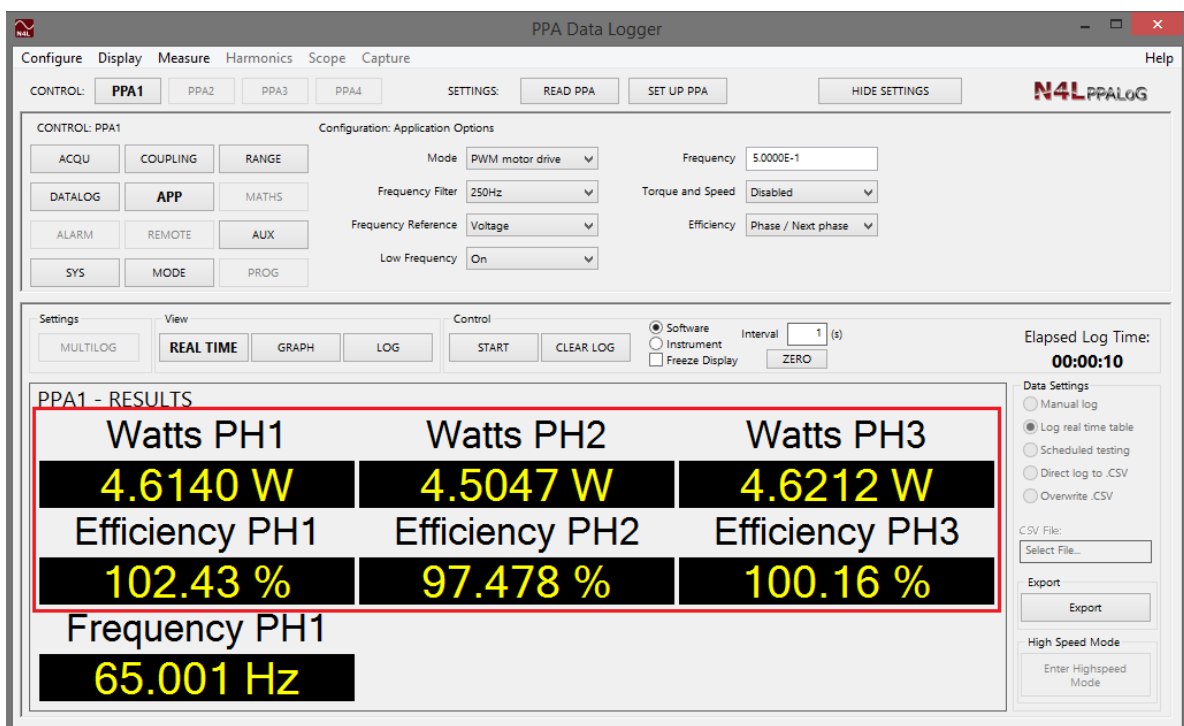
Efficiency measurements will be taken, calculated and displayed as per the configuration set earlier. From our selection of Phase / Next Phase then:

Efficiency PH1 = Watts PH1 / Watts PH2
Efficiency PH2 = Watts PH2 / Watts PH3
Efficiency PH3 = Watts PH3 / Watts PH1

8 Oscilloscope Mode

8.1   User Guide

In this section we will describe the use of the oscilloscope mode, during this test the test subject was a 3 Phase PWM Inverter, supplying a 3 Phase induction motor.

To enter Oscilloscope mode and change oscilloscope settings, in the PPAIoG screen click on the Mode Icon.

Use the drop down menu from the Operation Mode and select Oscilloscope. (Red Boxes)

Set the Timebase Parameter (Blue Box)
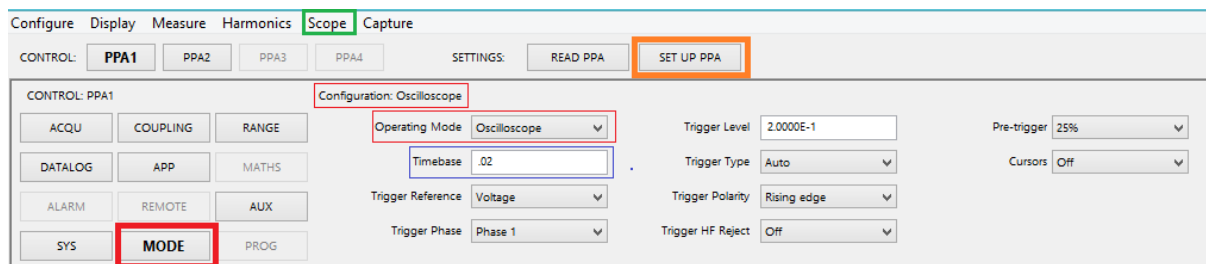
Click on 'SET UP PPA' (Orange Box)

Click on Scope (Green Box)

Other oscilloscope settings can be set in this configuration pane.

Click on SINGLE or CONTINUOUS to display the waveform.

Scope data will now be displayed in PPA screen

Single mode will display the waveform data when the button is clicked.
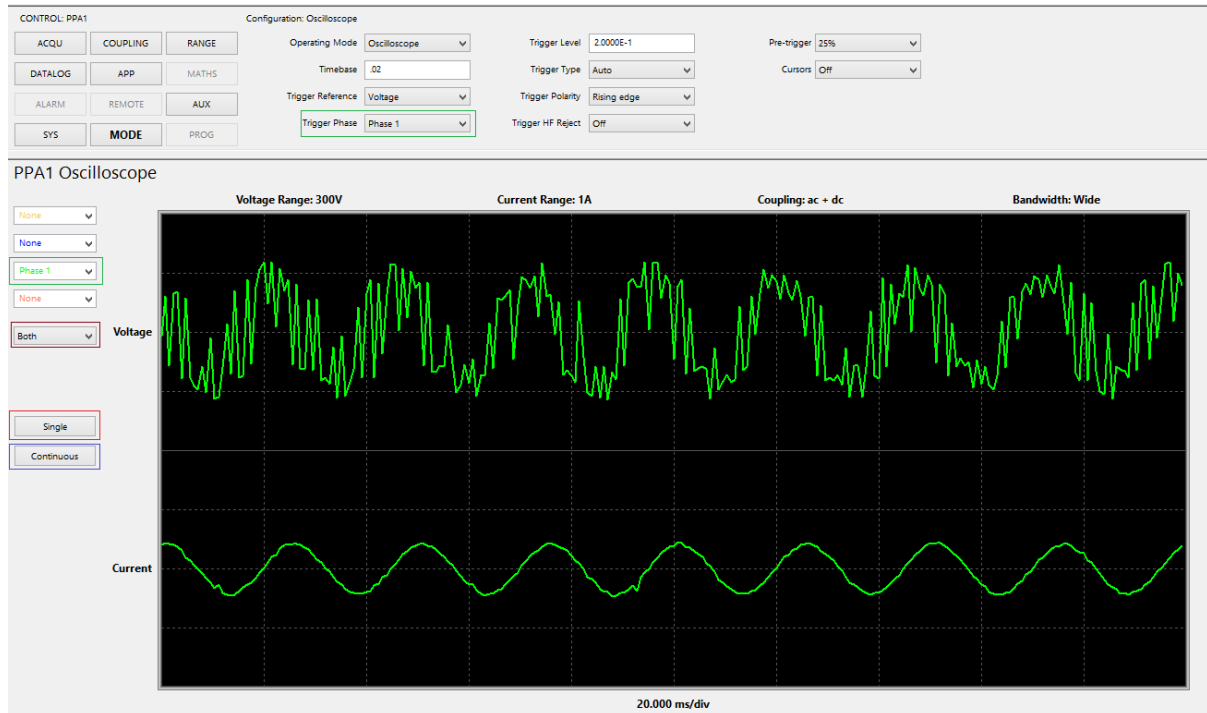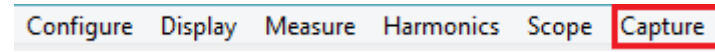
Continuous will display a continuously updated waveform on the display.

Set Voltage/Current/Both to be viewed on screen (Brown Box)

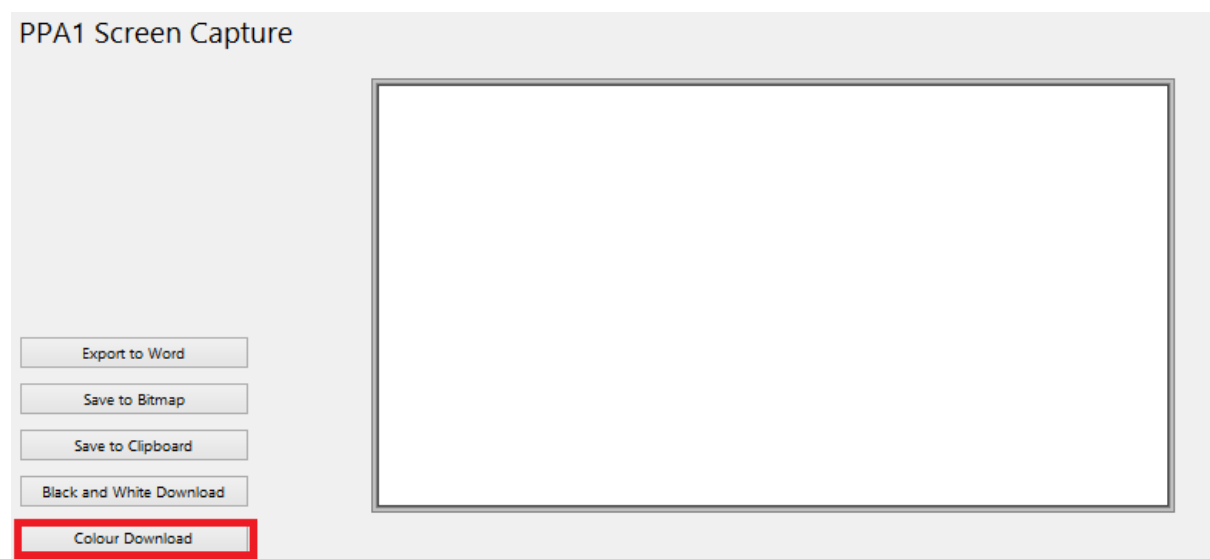# 9 Screen grab from PPA screen.

9.1 User Guide

Click on Capture in the Datalog main menu
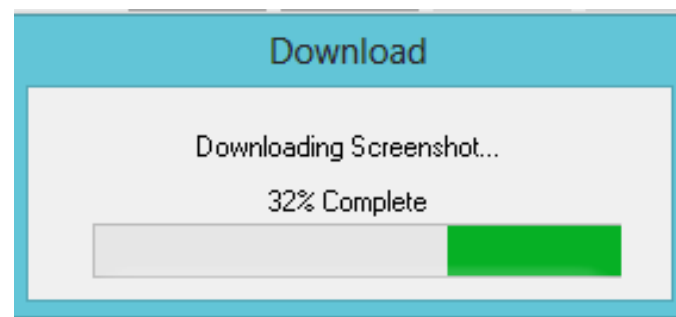

Screen Capture window will open
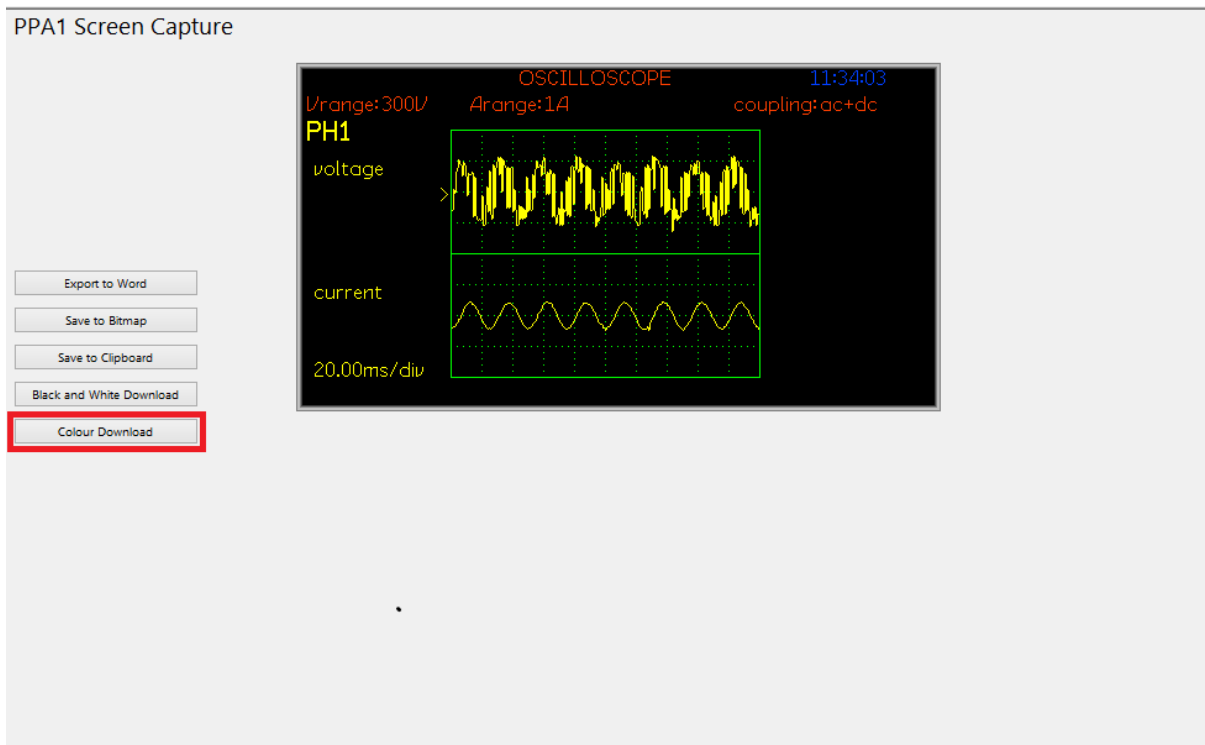

Click on Colour Download

Downloading will begin as shown below

Once downloading has completed your PPA screen shot will be published into the blank panel.

Black and white screen grab is also available and will perform the download in a shorter period of time.
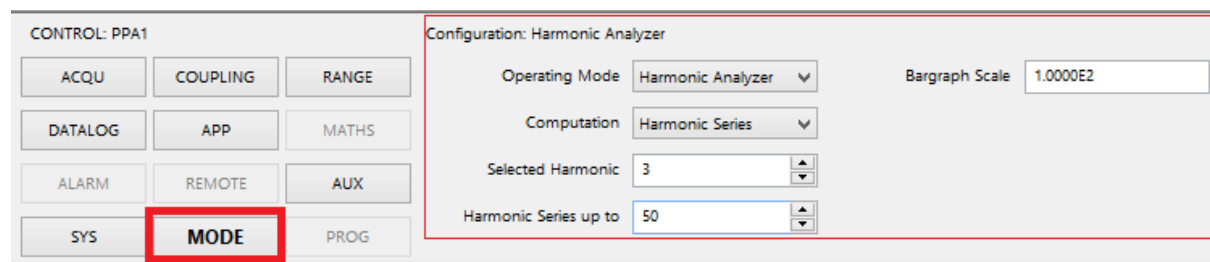
10   Harmonics Analyzer

10.1   User Guide

In the PPAIoG screen, click on the Mode Icon

Use the drop down menu from the Operation Mode and select Harmonic Analyzer. (Red Boxes)

Select Harmonic parameters

Set your required configuration, in the screenshot above Harmonic Series computation and 50 Harmonics will be recorded.
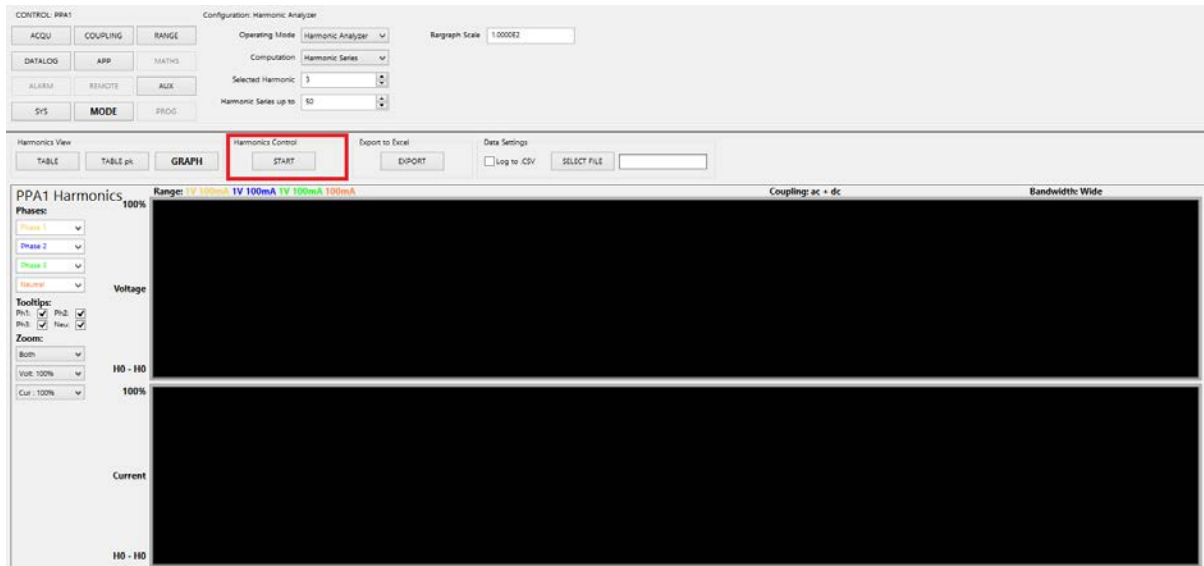
Click 'SET UP PPA'

Click on Harmonics in the PPA header

Harmonics display screen will now be present

Click on start in Harmonics Control to begin datalogging harmonic data.

Harmonics data will now be collected. Click on Stop once completed and to review results.

Harmonic results can now be viewed in either a Table or Graph format by selecting the appropriate Icon (Blue Box)

To zoom in on the graph data, use the Zoom Icon's (Yellow Box). You now have the opportunity to view the graph with either parameters selected or both together

To view a snapshot of any given Harmonic result (Red Box-H39 Voltage shown) hover your mouse over the appropriate Harmonic to be viewed

All results can be stored in either an Excel or .CSV format by selecting the appropriate Icon to click (Green Box)

If you require any further assistance with the operation of PPALoG please do not hesitate to contact your local distributor or N4L on support@newtons4th.com